

Influence of Knowledge Management Processes on Organizational Performance in Service Sector: An Empirical Study

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ABSTRACT: *This research attempts to establish a link between knowledge management processes and organizational performance in knowledge intensive service sectors. The key dimensions of knowledge management processes have been identified which could influence the organizational performance. Metric has been developed for the empirical investigation of the relationships between these research constructs. Structural Equation Modelling (SEM) using partial least square techniques has been used to test these hypotheses with a sample size of 491 knowledge workers (330 - Higher educational institutions and 161 from the IT companies) to investigate the empirical relationships between the factors. All the four hypotheses were supported. The testing of the hypotheses justified the identification of the key dimensions of KM as the critical success factors in terms of the organizational performance. Implications of the study would enable the strategic planning managers to make their knowledge management processes more effective so as to enhance the organizational performance.*

Keywords: *Knowledge Management Processes, Organizational Performance, IT Companies, Higher Education, Structural Equation Modelling*

I. INTRODUCTION

Service sectors in India contribute to a great deal to the national GDP in general, and the knowledge intensive service sectors play a major role, which include education sector, IT sector and health maintenance sector. Globalization has imposed a strict adherence to the international quality standards and Strategic Human Resource Management is now acting as an enabler to the Knowledge Management (KM) which is considered to be the driver of organizational performance.

In the context of knowledge intensive service organizations, it is believed that Knowledge Management Processes (KMP) have a major role to play in the Organizational Performance (ORP). Many researchers have undertaken qualitative studies on the direct impact of knowledge management contributing to the ORP ([1]-[4]), but not many have considered empirical study of the influence of KMP on ORP. Knowledge intensive service organizations in their group include: educational institutes, hospitals, software industries, legal consultants, banks, marketing services, consultancy services etc. The major resources in such organizations will be intellectual capital, or more specifically, the knowledge residing in the minds of the employees of such organizations. While Knowledge Management (KM) is the enabler for tapping such knowledge which is stored in the minds of the people in the organization and making it available for everyone to use for the organizational growth, the influence of KMP on the ORP has not been studied in depth to the extent required. This study is important because a lot of resources have been invested on the development of KMP so there is a need for its worth justification and it can be only through the assessment of its contribution to the ORP. It is under this backdrop of the importance gained by the knowledge as a 'strategic asset' in the knowledge intensive service organizations, this research has been conducted to assess in quantitative terms the impact made by the KMP on ORP.

II. LITERATURE REVIEW

2.1. Knowledge Management Processes (KMP)

Learning is gaining an importance more than ever before because the World economy has shifted towards the concept of knowledge as a strategic asset [5]. Ahmed et al., [6] have observed that the most efficient strategic planners are on the lookout for the most recent knowledge in their area of business research so that they can surpass the expectations of their customer. Disappointments connected with past administration choices has inspired managers to look for the most modern information which can be transformed into knowledge.

Intangible assets mainly in the form of intellectual capital play a key role in helping organizations achieve higher level of organizational performance [3]. Knowledge has already taken over other forms of resources such as land, labour, and capital [7]. While it comes to the measurement issue of KMP the following dimensions become important in terms of the service sectors in general and the IT and higher Education sectors in particular ([8]-[11]). Through the process of Analytical Hierarch Process (AHP) a set of dimensions have been identified for this research, which are presented below as used in the questionnaire development (Table 1).

Table 1: The Dimension, Meaning, Literature Support, and the Sample Item - KMP

Dimension	Author, Year	Description	Sample Item
1. Knowledge Acquisition	[11]-[14]	Knowledge acquisition is the process the company uses for obtaining new information and knowledge	Organization provides multiple sources of information to enable the faculty and the students to acquire knowledge.
2. Knowledge Distribution	[9],[15]	It comprises the dissemination of acquired knowledge between different individuals or units within a company. This process is principally accomplished through informal interactions among the employees of the company.	Organization has formal mechanisms to guarantee the sharing of best practices among different fields of the activity.
3. Knowledge Interpretation	[16]-[18]	Processes required in order that information is understood and assimilated by employees in order to transform it into a new common knowledge.	All organization members share the same aim to which they feel committed.
4. Organizational Memory	[8],[19]	It is both the tacit and explicit knowledge stored in the database of the organization and made available for the future use.	The organization has databases to stock its experiences and knowledge so as to be able to use them later on.

2.2. Organizational Performance (ORP)

Measurement of ORP has now been dominating the management research in terms of gaining of the competitive advantage in the market and it has become one of the most popular terms in today’s management terminology. The idea of managing organizational performance has emerged from the concept of enhancing the efficiencies of the process which are important for business success particularly in the knowledge intensive service sectors.

Performance is about doing the work as well as monitoring the results achieved. It is thus the outcome of work because they provide the strongest linkage to the strategic goals of an organization, customer satisfaction and economic contributions. The term “Performance Management and Measurement” refers to any integrated, systematic approach to improving organizational performance to achieve strategic aims and promote an organization’s mission and values. In that sense organizational performance management is quite different than individual performance management which specifically targets the personal performance of an employee although the latter comprises an essential part of the overall organizational performance framework. In fact, a Performance Management system aims at improving the results of people’s efforts by linking these to the organization’s goals and objectives. It is, ideally, the means through which employees’ performance can be improved by ensuring appropriate recognition and reward for their efforts, and by improving communication, learning and working arrangements. Table 2 provides the salient aspects of ORP as referred to this research.

Table 2: The Dimension, Meaning, Literature Support, and the Sample Item - ORP

Dimension	Author, Year	Description	Sample Item
Organizational Performance	[20]-[26]	It is the indicators of performance of an organization can be broadly categorized in to Operational performance, Financial performance and Non-financial performance factors	Our investments in R&D are high.

III. RESEARCH OBJECTIVES

The aim of this research is to study the dynamics of knowledge management processes on the organizational performance in knowledge intensive service organizations. To accomplish this aim, following objectives have been developed.

1. Identify the dimensions which constitute the knowledge management processes as relevant to knowledge intensive service organizations.
2. Develop a metric to measure above mentioned research constructs and validate it.
3. Develop a hypothetical model linking the various dimensions of the research constructs.
4. Obtain the empirical evidence for the inter-relationships between the dimensions of the research constructs.
5. Draw implications and make suggestions to the organizations to enhance the organizational performance through the improvement in knowledge management processes.

IV. RESEARCH METHODS

4.1 The Hypothetical Research Model - Linkage between KMP and ORP

As per the objectives of the research, the hypothetical model to study the influence of KMP dimensions on ORP is developed based on the literature available. If KM, as it claims, focuses on building the successful link between knowledge and performance [27], then it is logical to assume KM activities will help to produce valid organizational knowledge, which is justified by its ability to perform [28]. A performance measurement

framework is therefore required to determine how successful KM activities have been in attaining organizational objectives [29]. Many organizations have used KM and organizational performance measurement for internal management [30]. The EFQM Excellence Model is designed as an audit tool to facilitate excellent quality management, hence focuses on auditing what has already happened, rather than addressing strategic issues such as formulation and evaluation of strategy ([31], [32]). It is important to create insights into the value drivers, which are the vital intangible assets that determine future success and form the basis for formulating resource based strategies [33]. So, as a suitable measurement framework for KM, organizational performance is important [30]. Many researchers have emphasized the importance of knowledge infrastructure and processes for KM ([34]-[37]) for producing influence on organizational performance.

In general, it is considered as the process of developing new knowledge and insights derived from the common experiences of people within the organization and it has the potential to influence behaviors and improve a firm's capabilities [38]. Drawing upon these early research, Jimenez-Jimenez and Sanz-Valle [3] have identified four processes of KM, namely, acquisition, distribution, interpretation and organizational memory, which are of special interest in the context of organizational performance. It is important to find if the KM processes have a bearing on organizational performance, and hence, the following hypotheses have been postulated.

- H1: Knowledge acquisition has a significant influence on organizational performance.
 - H2: Knowledge distribution has a significant influence on organizational performance.
 - H3: Knowledge interpretation has a significant influence on organizational performance.
 - H4: Organizational memory has a significant influence on organizational performance.
- The hypothetical research model is depicted in fig. 1.

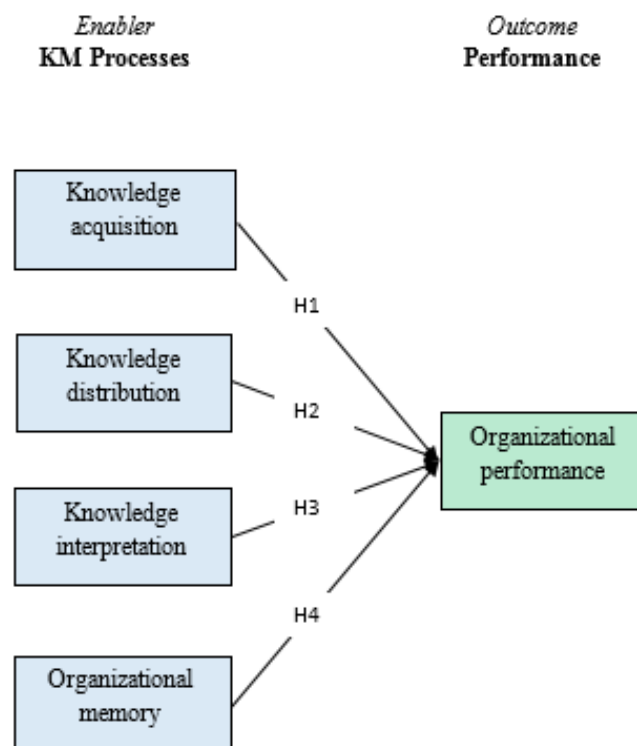


Figure 1: Hypothetical Research Model

4.2 Development of the Questionnaire

The development of the questionnaire was through the standard procedure of skimming through the available scales and metrics, consulting with the experts in the field, qualified respondents, and mainly through the literature [39]. However, as the three research constructs were of research interest to both academics and practitioners in service as well as product industries standard questionnaires which were available and some of the items were readily usable with little or no modification to suit to the requirements of this research. The dimensions used under each of the research constructs, the contributing authors, the descriptions and the sample item of the questionnaire is given in the section Literature Review. The questionnaire had three distinct components of primary data collection: the first was demographics, the second quantitative data through Likert 5-point scale, and the third qualitative data through open-ended questions.

4.3 Sample Description

Considering the intensive use of knowledge and its application for the achievement of business goals and objectives the two sectors chosen were Higher Educational (HE) Institutions and the IT Companies. Ease of access to the employees and data collection through electronic means was also the inclusion criterion.

In Tamil Nadu State there are 21 state government universities, 14 central government institutions, 08 state & central government joint support universities, 28 private universities (deemed to be universities) and there are more than 100 colleges affiliated to these universities [40]. While obtaining the actual number of faculty in these institutes is beyond the scope of this research as the number is ever growing an estimation was made to define the population size and it was found that about 25,000 faculty members are working as Asst. Professor, Associate Professor, and Professor in these institutes. There are 238 IT parks and 1683 software exporting units in Tamil Nadu and about 2,70,000 employees in IT industries in Tamil Nadu [41].

As per the second generation statistical analysis of Structural Equation Modelling used in this research, sample size is not an issue as long as the minimum sample size criterion of above 200 is satisfied. The software has the technique of bootstrapping through which extrapolation into any sample size is possible. However, to be sure of the minimum sample size, the approach of specifying the precision of estimation desired first, and then determining the sample size necessary to ensure it [42] was adopted, according to which, the sample size necessary is about 188, however, to get a better sample distribution the sample size chosen in this research is 491 (HE institutions = 330; IT companies = 161). The main objective of this research is not the inter-sector comparison, instead the study of the impact of the knowledge management processes on organizational performance and hence proportionate random sampling was not necessary and simple random sampling has been adopted. The sample size estimation is based on the 2% defect in sample (based on pilot study) and an acceptable error of 2%. The target respondents were the teaching faculty from HE institutions and managers from the IT companies.

4.4 Method of Data Collection

Questionnaires were administered both on personal and electronic mode. Out of 600 questionnaires distributed, 520 completed questionnaires were collected back after repeated pursuit (87% return rate). Informal interviews have also been conducted with the employees during the field visits. The sample has been randomized across the knowledge workers in the HE institutes and the IT companies in Tamil Nadu. The quantitative analysis through the questionnaire survey has been substantiated with the views of the knowledge workers both through the questionnaires as well as field visits.

4.5 Pilot Study and Analysis

The survey questionnaire is then subjected to a pilot test for a sample size of 32 for the content, construct and criterion validity. It was also subjected to confirmatory factor analysis and the original 51 items questionnaire is reduced to 30 items. This questionnaire is used for the primary data collection for the sample size of 491. The data thus collected was subjected to analysis which included descriptive statistics & inferential statistics using IBM SPSS 19, LISREL package for Goodness of Fit calculations, and SEM package SmartPLS 2.0 for constructing the measurement and structural model.

V. RESULTS AND DISCUSSION

5.1 Demographic details of Respondents

This section presents the demographic distribution for an understanding of the respondents' characteristics and their distinct features. As the descriptive provides an idea about the respondents details and background it provides strength to the inferences which are drawn through the data. The respondents chosen for this research are the knowledge workers of the Higher Education (HE) institutions and the IT sector. Table 3 gives the demographic details of the respondents.

The total sample size in this research was 491 (HE institutions = 330; IT companies = 161). The majority of the respondents happen to be male (67.6%) in this research (Table 3). Majority of the respondents are in the age group of 20-30 years (40.5%) followed by the age group of 30-40 years (27.5%). Educational qualification wise, majority of the respondents were post-graduates (40.5%) followed by graduates (26.9%). In terms of experience, majority had five to 10 years of experience (58%). The majority of the respondents were in the salary range of Rs. 20,000/= to 40,000/= (57.2%). Thus, the respondents are by and large normally distributed across each of their characteristics and majority are from a group which is competent enough to provide the required information both in qualitative and quantitative forms and are mature enough, adequately qualified, well-experienced, and are competent enough to provide data and information for this research.

Table 3: Demographic distribution of the Respondents (N = 491)

Attributes	Frequency	Percentage
Gender		
Male	332	67.6
Female	159	32.4
Age		
Less than 20 years	65	13.2
20 – 30 years	199	40.5
30 – 40 years	135	27.5
40 – 50 years	52	10.6
Great than 50 years	40	8.1
Educational qualification		
Diploma	68	13.8
Graduate	132	26.9
Post graduate	199	40.5
PhD	52	10.6
Others	40	8.1
Work Experience		
Less than two years	12	2.4
2 – 5 years	74	15.1
5 – 10 years	120	24.4
More than 10 years	285	58.0
Income per month(INR)		
Less than 10,000	2.9	2.9
10,000 to 20,000	13.8	13.8
20,000 to 30,000	28.1	28.1
30,000 to 40,000	29.1	29.1
40,000 to 50,000	15.1	15.1
Above 50,000	11.0	11.0

5.2 Measurement Model

The maximum likelihood method of estimation was chosen for conducting SEM analysis. Table 4 represents the Goodness of Fit (GOF) indices for both the initial measurement models and final measurement model for all constructs. The last two rows represent GOF results for the full measurement model and recommended values for acceptable GOF. The overall GOF measures for some of the initial models did not meet the acceptable criteria, so the models were revised based on assessment of factor loading (Table 6) and suggestion from modification indices. This resulted in reduction of 26 item original a priori metric, into 15 item scale which was subjected to GOF test criterion. GOF results for both individual measurement models and full measurement models are within the acceptable range with non-significant χ^2 (Chi-square) (≥ 0.05), goodness fit index (GFI), adjusted goodness fit index (AGFI) and Tucker-Lewis Index (TLI) values greater than 0.9 and Root Mean Square Error of Approximation (RMSEA) value < 0.10 .

Table 4: Goodness of test results for measurement models

Construct	No. Of Items	χ^2	Df	p	χ^2/Df	GFI	AGFI	RMSEA	TLI
KNA - Initial	5	123.2	4	0.04	30.6	0.94	0.84	0.13	0.84
KNA - Final	3	1.64	2	0.32	0.5	0.86	0.94	0.12	0.96
KND - Initial	5	121.3	4	0.04	20.4	0.92	0.94	0.06	0.93
KND - Final	3	2.6	2	0.68	0.8	0.84	0.94	0.03	0.92
KNI - Initial	5	85.5	4	0.004	10.8	0.92	0.97	0.04	0.97
KNI - Final	3	8.3	2	0.16	2.8	0.93	0.8	0.04	0.93
ORM - Initial	5	342.9	4	0.04	85.5	0.96	0.94	0.13	0.91
ORM- Final	3	6.4	2	0.66	1.8	0.95	0.87	0.08	0.92
ORP – Initial	6	171.3	5	0.04	24.4	0.93	0.96	0.08	0.93
ORP - Final	3	3.6	2	0.68	0.9	0.85	0.93	0.12	0.92
				≥ 0.05	≤ 3.0	≥ 0.9	≥ 0.9	≤ 0.1	≥ 0.9

Legend:

- Knowledge Acquisition (KNA)
- Knowledge Distribution (KND)
- Knowledge Interpretation (KNI)
- Organizational Memory (ORM)
- Organizational Performance (ORP)

To verify the reliability of the latent variables in the model, internal consistency reliability measure, item reliability measure and composite reliability measures were calculated. Table 5 shows the Cronbach’s alpha coefficient and the composite reliability result for the final model. The alpha coefficient has the acceptable

value ranging from 0.6 to 0.9, indicating a moderate to high level of internal consistency. The composite reliability estimate also ranges from 0.6 to 0.9 indicating moderate to high reliability values. The results of the convergent validity assessed based on factor loading (> 0.6) indicate a strong effect of the factor on the variable of study (Table 6). To test for discriminant validity, the square root of average variance extracted (AVE) for each construct was compared with the correlation between the construct and the other constructs. Table 7 shows acceptable discriminant validity between each pair of construct, with all AVE square roots greater than the correlation between the constructs.

Table 5: The Reliability Measures of the Data

	AVE	Composite Reliability	R Square	Cronbach's Alpha	Communality	Redundancy
KNA	0.63	0.8283	0.6387	0.6654	0.63	0.1157
KND	0.7363	0.8924	0.668	0.8171	0.7363	0.4407
KNI	0.7451	0.8973	0.6849	0.8263	0.7451	0.2647
ORM	0.8004	0.9231	0.4041	0.8749	0.8004	0.0996
ORP	0.7913	0.919	0.9266	0.8664	0.7913	0.0523

Table 6: Factor Loading after Reduction

	CMR	KNA	KND	KNI	ORM	ORP	PRA	RCT	TMW	TRD
KNA1	0	0.5134	0	0	0	0	0	0	0	0
KNA3	0	0.9535	0	0	0	0	0	0	0	0
KNA4	0	0.8469	0	0	0	0	0	0	0	0
KND1	0	0	0.8964	0	0	0	0	0	0	0
KND2	0	0	0.9326	0	0	0	0	0	0	0
KND3	0	0	0.7319	0	0	0	0	0	0	0
KNI1	0	0	0	0.8652	0	0	0	0	0	0
KNI2	0	0	0	0.9273	0	0	0	0	0	0
KNI4	0	0	0	0.7918	0	0	0	0	0	0
ORM1	0	0	0	0	0.8579	0	0	0	0	0
ORM2	0	0	0	0	0.8881	0	0	0	0	0
ORM3	0	0	0	0	0.9362	0	0	0	0	0
ORP2	0	0	0	0	0	0.8596	0	0	0	0
ORP3	0	0	0	0	0	0.9556	0	0	0	0
ORP5	0	0	0	0	0	0.8496	0	0	0	0

Table 7: Inter-item Correlation and Discriminant Validity

	CMR	KNA	KND	KNI	ORM	ORP	PRA	RCT	TMW	TRD
KNA	0.6564	1	0	0	0	0	0	0	0	0
KND	0.5985	0.8376	1	0	0	0	0	0	0	0
KNI	0.7599	0.632	0.5408	1	0	0	0	0	0	0
ORM	0.3052	0.2518	0.354	0.377	1	0	0	0	0	0
ORP	0.7617	0.6293	0.6586	0.8606	0.4562	1	0	0	0	0

5.3 Structural Model

From the main hypotheses testing the causal relationship between the constructs of study was established and a differential causation was observed for the research constructs. So, the next research question that was to be addressed was dynamics between these constructs when these variables are interlinked through the theoretical models. The obvious solution was the Structural Model of the SEM which has been described in the previous chapter. Structural model of the analysis gives the inter-relationships between the exogenous and the endogenous variables of study. This is used for the hypothesis testing at the macro level of the latent variables. The factor loadings after reduction, path coefficients, and R2 are shown in Table 5 and the t-values are shown in Table 8. For all the relationships established, the path coefficient values ranged from 0.03 to 0.6 and the R2 values were up to 0.9 which is quite adequate in comparison to the other research studies in this field (cut off 0.1) ([33],[43]). The strength of the relation is moderate and the percentage influence of the exogenous variables on the endogenous variables as expressed by R2 is acceptable.

The SEM indicated that the following hypotheses were supported:

- H1: Knowledge acquisition has a significant influence on organizational performance.
- H2: Knowledge distribution has a significant influence on organizational performance.
- H3: Knowledge interpretation has a significant influence on organizational performance.
- H4: Organizational memory has a significant influence on organizational performance.

Table 8: t-statistic of Hypothetical Research Model

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics ((O/STERR))	Hypothesis
KNA ->ORP	-0.3129	-0.3124	0.0697	0.0697	4.4909*	Supported
KND ->ORP	0.265	0.259	0.0763	0.0763	3.4724*	Supported
KNI ->ORP	0.5314	0.5264	0.0501	0.0501	10.6118*	Supported
ORM ->ORP	0.1224	0.1178	0.0407	0.0407	3.0081*	Supported

*(1% significance; $t > 2.58$).

VI. FINDINGS AND IMPLICATIONS TO THE STRATEGIC MANAGERS

Knowledge management has emerged out to be a dimension which has a significant influence on Organizational performance. So, one of the most important implications to the policy makers and the managers of knowledge intensive service organizations is that the most effective means to achieve better organizational performance is through strengthening the KM processes.

It is implied that the managers of the service sectors need to consider the four major critical success factors recommended by a group of researchers who have extensively worked on the KM models and arrived at: the human based factors (leadership, culture, and people); organizational factors (processes and structures); technology based factors (infrastructure and applications); management (strategy, goals, and metrics) ([44]-[47]).

It is a general observation that KM processes heavily rely on technology and the service organizations need to invest on these technologies particularly the Information Technology (IT). A set of organizational changes are strongly recommended based on the information gathered through the field visits and the extensive literature review in which the past experience of the service organizations have been analysed. To have a positive impact on elements of knowledge, IT has to be introduced in a phased manner.

It is also necessary that IT is backed up by changes in people, organizational climate and organizational processes. Organizational change helps an organization to optimize processes and define process oriented structure. Further, a behavioural and cultural change has to be brought in the service providers to develop flexibility to adapt to the changing situations. A strong culture, trust and transparency in all areas of the organization may be necessary to make the KM processes to be effectively supported by the knowledge workers.

VII. CONCLUSION

This research primarily focused on the study of the influence of the dimensions of KM processes: knowledge acquisition, knowledge distribution, knowledge interpretation, and organizational memory on organizational performance.

The revelation through hypothesis testing was that all the dimensions of KMP had a significant influence on organizational performance. All these results were in accordance to the earlier findings in various other contexts.

These revelations have led to the development of the strategic implications to the managers of the knowledge intensive service industries which may be considered these organizations for enhancing their organizational performance.

The research has a few limitations which provide scope for future research. First of all, this is mainly a quantitative analysis and all the limitations of the second generation statistical analysis are applicable to this research. Sample size has always been an issue in empirical studies and in this research even though the standard formula has been adopted the assumptions in the formula act as the limitation for the possibility of generalization of the results completely. Finally, this is a perceptions based study and has its own methodical limitations. Future researchers may consider the possibility of studying the combined influence of knowledge management as well as total quality management as the mediating variable. In this modern era based on knowledge economy this research is quite timely and the implications to the managers drawn in this research may be of immense use in enhancing the organizational performance.

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